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Summary report on the technical analysis of the first biennial update report of the Republic of Korea submitted on 29 December 2014

In accordance with decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention (non-Annex I Parties), consistent with their capabilities and the level of support provided for reporting, should submit their first biennial update report (BUR) by December 2014. The least developed country Parties and small island developing States may submit BURs at their discretion.

Further, in accordance with paragraph 58(a) of the same decision, the first round of international consultation and analysis (ICA) will be conducted for non-Annex I Parties, commencing within six months of the submission of their first BURs. The process of ICA includes two steps: the technical analysis of the submitted BURs, followed by a workshop on the facilitative sharing of views under the Subsidiary Body for Implementation.

This summary report presents the results of the technical analysis of the first BUR of the Republic of Korea undertaken by a team of technical experts in accordance with the modalities and procedures contained in the annex to decision 20/CP.19.

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I. Introduction and process overview

A. Introduction

1. In accordance with decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention (non-Annex I Parties), consistent with their capabilities and the level of support provided for reporting, should submit their first biennial update report (BUR) by December 2014. The least developed country Parties and small island developing States may submit BURs at their discretion. Further, in accordance with paragraph 58(a) of the same decision, a round of international consultation and analysis (ICA) will be conducted for non-Annex I Parties, commencing within six months of the submission of their first BURs. The process of ICA includes two steps: the technical analysis of the submitted BURs, resulting in a summary report for each BUR analysed, followed by a workshop on the facilitative sharing of views under the Subsidiary Body for Implementation.

2. This summary report presents the results of the technical analysis of the first BUR of the Republic of Korea undertaken by a team of technical experts (TTE) in accordance with the provisions on the composition, modalities and procedures of the TTE under ICA contained in the annex to decision 20/CP.19.

B. Process overview

3. The Republic of Korea submitted its first BUR on 29 December 2014.

4. The technical analysis of the BUR took place from 18 to 22 May 2015 in Bonn, Germany, and was undertaken by the following TTE drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Mr. Amnat Chidthaisong (Thailand), Ms. Ana-Maria Danila (Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE) member from the European Union), Ms. Lilian Portillo (former CGE member from Paraguay), Mr. Kiyoto Tanabe (Japan), Mr. Samir Tantawi (Egypt) and Ms. Songli Zhu (China). Ms. Danila and Ms. Zhu were the co-leads. Ms. Ruta Bubniene, Mr. Davor Vesligaj and Ms. Marion Vieweg-Mersmann from the secretariat provided administrative support to the TTE.

5. During the technical analysis, the TTE and the Republic of Korea also engaged in discussion via teleconferencing, primarily to reach a common understanding on the identification of the capacity-building needs. Following the technical analysis of the BUR, the TTE prepared and shared a draft summary report with the Republic of Korea on 7 August 2015 for its review. The Republic of Korea, in turn, provided its feedback on the draft summary report on 30 October 2015.

6. The TTE responded to and incorporated the comments referred to in paragraph 5 above from the Republic of Korea and finalized, in consultation with the Republic of Korea, the summary report on 7 February 2016.

II. Technical analysis of information reported in the biennial update report

A. Scope of the technical analysis

7. The scope of the technical analysis is outlined in decision 20/CP.19, annex, paragraph 15, according to which the technical analysis aims to, without engaging in discussion on the appropriateness of these actions, increase transparency of mitigation actions and their effects, and shall entail the following:

(a) Identification of the extent to which the elements of information listed in the ICA guidelines contained in decision 2/CP.17, annex IV, paragraph 3(a), are included in the BUR of the Party concerned (see chapter II.B);

(b) A technical analysis of the information contained in the BUR, specified in the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" (hereinafter referred to as the UNFCCC reporting guidelines on BURs) contained in annex III to decision 2/CP.17, and any additional technical information provided by the Party concerned (see chapter II.C);

(c) Identification of, in consultation with the Party concerned, capacity-building needs related to the facilitation of reporting in accordance with annex III to decision 2/CP.17 and to the participation in ICA in accordance with annex IV to decision 2/CP.17, taking into account Article 4, paragraph 3, of the Convention (see chapter II.D).

8. The remainder of this chapter presents the results of each of the three parts of the technical analysis of the Republic of Korea's BUR outlined in paragraph 7 above.

B. Overview of the elements of information reported

9. The elements of information referred to in paragraph 7(a) above include: the national greenhouse gas (GHG) inventory report; mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and the progress made in their implementation; information on domestic measurement, reporting and verification (MRV); and support received.

10. Further, in accordance with decision 20/CP.19, annex, paragraph 15 (a) in undertaking the technical analysis of the submitted BUR, the team of technical experts shall identify the extent to which the elements of information listed in the guidelines contained in decision 2/CP.17, annex IV, paragraph 3 (a), are included in the BUR of the Party concerned. The results of this analysis are presented in tables 1, 2 and 3 below.

1. National greenhouse gas inventory

11. The parts of the UNFCCC reporting guidelines on BURs on reporting information on GHG emissions by sources and removals by sinks in BURs are contained in decision 2/CP.17, paragraph 41(g), and annex III, paragraphs 3–10, of the same decision. Further, as per decision 2/CP.17, annex III, paragraph 3, non-Annex I Parties should submit updates of national GHG inventories according to paragraphs 8–24 of the "Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention" as contained in the annex to decision 17/CP.8. The scope of the updates on national GHG inventories should be consistent with capacities, time constraints, data availabilities and the level of support provided by developed countries Parties for biennial update reporting.

12. Table 1 below presents results of the identification of the extent to which the elements of information on GHGs are included in the first BUR of the Republic of Korea in accordance with the relevant parts of the UNFCCC reporting guidelines on BURs.

Table 1

Identification of the extent to which the elements of information on greenhouse gases are included in the first biennial update report of the Republic of Korea

Decision	*Provision of the reporting guidelines*	*Yes/ Partly /No*	*Comments on the extent of the information provided*
Decision 2/CP.17, paragraph 41(g)	The first BUR shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available	Yes	
Decision 2/CP.17, annex III, paragraph 5	The updates of the sections on the national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the Revised 1996 IPCC Guidelines for National GHG Inventories, the IPCC good practice guidance and Uncertainty Management in National GHG Inventories, and the IPCC good practice guidance for LULUCF; any change to the emission factor may be made in the subsequent full national communication	Partly	General updated statistical data on activity levels are reported in the BUR, under the section on national circumstances and covering energy (including transport and buildings), agriculture, forestry and waste sectors, but not on the level of disaggregation which could allow TTE to understands its effect on GHG emission and removals trends. The Republic of Korea uses country-specific MRV Guidelines that are based on the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		

Decision	*Provision of the reporting guidelines*	*Yes/ Partly /No*	*Comments on the extent of the information provided*
	• Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors)	Partly	The inventory section of the BUR is provided as an update of the third national communication in which the GHG inventory covered the period 1990–2009. Detailed GHG inventory data as required in table 1 are provided in the annex to the BUR in the format of the relevant tables included in the biennial reporting common tabular format (BR-CTF) for Annex I Parties. This format allows for reporting information required in Table 1 in decision 17/CP.8, annex, providing LULUCF summary information as required by GHG inventory reporting guidelines for annex I Parties
	• Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF_6)	Partly	Detailed GHG inventory data as required in table 1 are provided in the annex to the BUR in the format of the relevant tables included in the biennial reporting common tabular format (BR-CTF) for Annex I Parties. This format allows for reporting information required in Table 1 in decision 17/CP.8, annex, providing LULUCF summary information as required by GHG inventory reporting guidelines for annex I Parties
Decision 2/CP.17, annex III, paragraph 6	Non-Annex I Parties are encouraged to include, as appropriate and to the extent that capacities permit, in the inventory section of the BUR:		
	• Tables included in annex 3A.2 to chapter 3 of the IPCC good practice guidance for LULUCF	Partly	Republic of Korea used the GPG for LULUCF, but did not provide tables included in annex 3A.2 to chapter 3 of GPG for LULUCF
	• The sectoral report tables annexed to the Revised 1996 IPCC Guidelines	Partly	Sectoral data is reported but the reporting format does not correspond to the sectoral report tables
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in the previous national communications	Yes	

Decision	*Provision of the reporting guidelines*	*Yes/ Partly /No*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their national communications are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000)	Yes	
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex	Yes	A summary of emission trends is provided in the technical annex
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved	Yes	
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of the following gases by sources and removals by sinks:		
	• CO_2	Yes	
	• CH_4	Partly	CH_4 emissions are reported in units of CO_2 eq, not in units of mass
	• N_2O	Partly	N_2O emissions are reported in units of CO_2 eq, not in units of mass
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of HFCs, PFCs and SF_6	Yes	
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:	Yes	
	• International aviation	Yes	
	• Marine bunker fuels	Yes	
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emissions by sources of other GHGs such as:	No	
	• CO	No	
	• NO_x	No	
	• NMVOCs	No	
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as SO_x, included in the Revised 1996 IPCC Guidelines, may be included at the discretion of the Parties	No	

Decision	*Provision of the reporting guidelines*	*Yes/ Partly /No*	*Comments on the extent of the information provided*
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of emission factors and activity data. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, emission factors and activity data used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	• Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol	Partly	Limited information is provided on the national MRV Guidelines that are supposed to describe methodologies for estimation of GHG emissions and removals in the Republic of Korea
	• Explanation of the sources of emission factors	Partly	General information is provided that external experts conduct technical reviews of country-specific emission factors
	• Explanation of the sources of activity data	Partly	Relevant ministries and designated agencies for preparation of sectoral drafts of the national inventory report are listed in the BUR, without clear mention if they are also sources of activity data
	• If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	No	
	o Source and/or sink categories	No	
	o Methodologies	No	
	o Emission factors	No	
	o Activity data	No	
	• Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building	No	

Decision	*Provision of the reporting guidelines*	*Yes/ Partly /No*	*Comments on the extent of the information provided*
Decision 17/CP.8, annex, paragraph 24	Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:	No	
	• Level of uncertainty associated with inventory data	No	
	• Underlying assumptions	No	
	• Methodologies used, if any, for estimating these uncertainties	No	

Abbreviations: BUR = biennial update report, CO_2 eq = carbon dioxide equivalent, GHG = greenhouse gas, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, MRV Guidelines = Guidelines for Measurement, Reporting and Verification of National GHG Inventory, NMVOC = non-methane volatile organic compound, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*.

2. Mitigation actions and their effects

13. The parts of the UNFCCC reporting guidelines on BURs on reporting information on mitigation actions in the BUR are contained in decision 2/CP.17, annex III, paragraphs 11–13.

14. The Republic of Korea did report mitigation actions in its first BUR. The mitigation actions reported are provided in tabular format.

15. Table 2 below presents results of the identification of the extent to which the elements of information on mitigation actions are included in the first BUR of the Republic of Korea in accordance with the relevant parts of the UNFCCC reporting guidelines on BURs.

Table 2
Identification of the extent to which the elements of information on mitigation actions are included in the first biennial update report of the Republic of Korea

Decision	*Provision of the reporting guidelines*	*Yes/ Partly /No*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 12	For each mitigation action or groups of mitigation actions including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information to the extent possible:		
(a)	Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators	Yes	
(b)	Information on methodologies and assumptions:		
	• Methodologies	No	Information on methodologies used for estimation of mitigation action effects and resulting GHG emission projections is not provided in the BUR but information was provided during the technical

Decision	*Provision of the reporting guidelines*	*Yes/ Partly /No*	*Comments on the extent of the information provided*
			analysis.
	• Assumptions	No	Information on assumptions used for estimation of mitigation action effects is not provided in the BUR, but information was provided during technical analysis.
(c)	Objectives of the action and steps taken or envisaged to achieve that action:		
	• Objectives of the action	Yes	
	• Steps taken or envisaged to achieve that action	Partly	Provided at national level, but not at sectoral or individual mitigation action levels. During the technical analysis, additional information on steps taken or envisaged were also provided.
(d)	Information on the progress of implementation of the mitigation actions and the underlying steps taken or envisaged, and the results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible:		
	• Progress of implementation of the mitigation actions	Partly	Provided at national level, but not at sectoral and individual mitigation action levels
	• Underlying steps taken or envisaged	Partly	Provided at national level, but not at sectoral and individual mitigation action levels
	• Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible	Partly	Provided at national level, but not at sectoral and individual mitigation action levels
(e)	Information on international market mechanisms	No	The BUR mentions that the use of carbon offsets will be possible under the Korean ETS, but no other information is provided. During the technical analysis, further information on international market mechanism (project-based CDM) was provided.
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on the description of domestic measurement, reporting and verification arrangements	Yes	

Abbreviations: BAU = business as usual, BUR = biennial update report, ETS = emissions trading scheme, GHG = greenhouse gas.

3. Finance, technology and capacity-building needs and support received

16. The parts of the UNFCCC reporting guidelines on BURs on reporting information on finance, technology and capacity-building needs and support received in the BUR are contained in decision 2/CP.17, annex III, paragraphs 14–16.

17. The TTE noted that the Republic of Korea reported on the substantial support provided to other countries to respond to their finance, technology and capacity-building

needs and has not identified any constraints and gaps or related financial, technical and capacity-building needs.

C. Technical analysis of the information reported

18. The technical analysis referred to in paragraph 7(b) above aims to, without engaging in discussion on the appropriateness of these actions, increase transparency of mitigation actions and their effects. Accordingly, the technical analysis focused on the transparency of information reported in BURs.

19. In addition to covering the information in the BUR and any additional technical information provided by the Party concerned, the technical analysis also focused, in relation to information reported on national GHG inventories, on the consistency of the methods used for developing those inventories with the appropriate methods developed by the Intergovernmental Panel on Climate Change (IPCC) and referred to in the UNFCCC reporting guidelines on BURs. The results of the technical analysis are presented in the remainder of the chapter.

1. Information on national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis

20. As per the scope defined in decision 2/CP.17, annex III, paragraph 2, the BURs should provide an update to information contained in the most recently submitted national communication, including, among other things, information on national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis. For national communications, non-Annex I Parties report national circumstances following reporting guidance contained in decision 17/CP.8, annex, paragraphs 3–5.

21. In accordance with decision 17/CP.8, annex, paragraph 3, the Republic of Korea, in its BUR, reports the following information on national circumstances: governmental structure, population, economy and key sectors (energy, transport, buildings, agriculture, forestry and waste). The Republic of Korea may consider providing the following information in its next BUR: a description of its national and regional development priorities, objectives and circumstances that will address climate change impacts; its geographical and climate profile; and specific needs and concerns arising from the adverse effects of climate change and impacts of the implementation of response measures. The TTE noted that this information would facilitate the understanding of these key national circumstances and enhance the completeness of the relevant sections of the BUR.

22. The Republic of Korea officially announced, in 2009, a midterm national GHG emission reduction target of 30 per cent in comparison to the 'business as usual' (BAU) level by 2020. The Government has determined reduction targets by sector. The transport sector was identified as the highest contributor to this national GHG reduction target (34.3 per cent), followed by the building (26.9 per cent), energy transformation (26.7 per cent) and industry (18.2 per cent) sectors.

23. The Republic of Korea, in its BUR, describes institutional arrangements relevant to the preparation of national communications and BURs on a continuous basis. The description covers key aspects of the institutional arrangements such as: legal status, and roles and responsibilities of the overall coordinating entity; involvement and roles of other institutions and experts; mechanisms for information exchange; quality assurance/quality control procedures; and official approval and publication of a GHG inventory report.

24. The TTE noted that information on institutional arrangements relevant to the preparation of the national communications and BURs on a continuous basis, as defined in the scope of the UNFCCC reporting guidelines on BURs, is not provided in the BUR. In response to technical clarification sought by the TTE, the Republic of Korea provided additional information on the institutions responsible for preparation, adjustment, review and approval of national reports, including the BUR. The Republic of Korea may consider providing this information in the next BUR in order to improve the completeness of reporting.

2. National greenhouse gas emissions by sources and removals by sinks

25. The Republic of Korea reported, in its BUR, information on national GHG inventories covering GHG emissions and removals for the years 1990–2012 using the country-specific "Guidelines for Measurement, Reporting and Verification of National GHG Inventory" (hereinafter referred to as the MRV Guidelines). Although it was not explicitly mentioned in the BUR, the Republic of Korea, based on the information from the third national communication (NC3), also uses the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and *Good Practice Guidance for Land Use, Land-Use Change and Forestry* for the preparation of its national GHG inventory. The TTE noted that, based on the response provided by the Republic of Korea, the MRV Guidelines are based on the methodologies from the abovementioned IPCC documents, but also contain country-specific emission factors and specific provisions for verification and approval of the GHG inventory.

26. The institutional arrangements for the national GHG management system of the Republic of Korea are well organized and enable the preparation and publication of a national GHG inventory in the form of a national inventory report (NIR) and common reporting format (CRF) tables on a regular annual basis and, at the moment, in Korean only. The Greenhouse Gas Inventory and Research Center of Korea (GIR) is the national entity responsible for preparation of the national GHG inventory as stipulated by the Framework Act on Low Carbon and Green Growth. Preparation of the GHG inventory is under the supervision of the National GHG Inventory Management Committee, and is supported by the National GHG Working Group and the National GHG Technical Group. In their review of the draft summary report, the Republic of Korea clarified that the designated agencies identified in the BUR are the sources of activity data.

27. Another advanced practice is the development and continuous improvement of the MRV Guidelines, performed by the GIR, which provides a methodological basis for the preparation of the GHG inventory. These national guidelines for the preparation of the GHG emissions inventory are important for enhancing the transparency and continuity of the national GHG inventory development. The TTE notes that in order to further increase the transparency of information provided in the BUR related to the development of the GHG inventory, it would be useful to provide more specific information contained in the MRV Guidelines in the next BUR, as well as to consider preparation of the NIR and the CRF tables in English and for them to be made publicly available. In response to technical clarification sought by the TTE, the Republic of Korea explained that for making the NIR and the CRF publically available, a comprehensive discussion among and a thorough review by national stakeholders is needed.

28. According to the BUR, total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 132.9 per cent between 1990 and 2012, whereas total GHG emissions including LULUCF increased by 144.1 per cent during this period. This increase in total GHG emissions was mainly

attributed to carbon dioxide (CO_2) emissions (constituting 90.0 per cent of the total GHG emissions excluding LULUCF in 2012), which increased by 147.5 per cent over this period. Over the same period, emissions of nitrous oxide (N_2O) increased by 48.9 per cent, whereas emissions of methane (CH_4) decreased by 6.8 per cent.

29. From the information provided in the BUR, the general methodologies applied for calculation of GHG emissions were not changed during the period 1990–2012; however, the TTE noted, based on the difference between data on GHG emissions in the BUR and the NC3 (see para. 30 below), that activity data and/or emission factors were updated and/or estimations of emissions and removals were moved to higher-tier methodologies for some source and sink categories. In response to technical clarification sought by the TTE, the Republic of Korea explained that the annual national GHG inventory of the Republic of Korea has been improved with recalculations in accordance with time-series consistency principle during the annual verification process of the national inventory. In order to estimate emissions consistently, the data time series are calculated using the same methodologies and data sources across all years. The TTE noted that completeness and transparency of reporting could be further improved if information on updates of methodology, activity data and emission factors used for the preparation of the GHG emissions inventory is provided in the next BUR.

30. The TTE noted the difference between the trends of GHG emissions and removals in the period 1990–2012 provided in the BUR and in the NC3. For example, the total GHG emissions in 2009 reported in the BUR were 597.8 million tonnes of carbon dioxide equivalent (Mt CO_2 eq) excluding LULUCF and 543.1 Mt CO_2 eq including LULUCF, whereas they were 607.6 Mt CO_2 eq and 564.7 kt CO_2 eq in the NC3, respectively. Another example is in the LULUCF sector where, according to the information from the NC3, net removals increased between 2005 and 2009, while, according to the BUR, they decreased in the same period. The TTE also noted that information on recalculations was not provided in the BUR. In response to technical clarification sought by the TTE, the Republic of Korea clarified that the recalculations were made for GHG emissions from the consumption of fluorinated gases due to the changes in the estimation methodology, and for GHG emissions from the forest land due to improvements in accuracy of the activity data. The TTE considers that transparency could be enhanced by providing rational for any recalculations in the next BUR.

31. The Republic of Korea provided data on GHG emissions and removals by gas and by sector in an appendix to the BUR. According to the information, GHG emissions from the energy sector in 2012 accounted for 87.2 per cent of total emissions, followed by the industrial processes (7.4 per cent), agriculture (3.2 per cent) and waste (2.2 per cent) sectors. In order to be consistent with the relevant reporting requirements, transparency of the information reported could be further enhanced by providing the emission results in the format of tables 1 and 2 contained in the annex to decision 17/CP.8 and the sectoral report tables contained in volume 1 of the Revised 1996 IPCC Guidelines, in particular, by providing emissions from subcategories corresponding with the Revised 1996 IPCC Guidelines, as well as providing CH_4 and N_2O emissions in units of mass together with carbon dioxide equivalent (CO_2 eq) values. In response to technical clarification sought by the TTE, the Republic of Korea provided a complete set of CRF tables for the inventory year 2012. The TTE commends the Republic of Korea for its efforts to report GHG emissions in a transparent and comprehensive manner.

32. The TTE noted significant fluctuations of trends for some subcategories and gases. For example, CO_2 emissions from the chemical industry, in the industrial processes sector, sharply decreased from 146.64 kt CO_2 eq in 2010 to 53.61 kt CO_2 eq in 2011 and then to 1.81 kt CO_2 eq in 2012, as shown in table 5.2 of the BUR. Another example is the decreasing trend of CH_4 emissions during the period 1990–2012, whereas CO_2 and N_2O

emissions continued to grow in this period. In the response to the technical clarification sought by the TTE, the Republic of Korea clarified that the main source of CO_2 emissions from the chemical industry category is ammonia production and the reason for such a change in the emissions level is the suspension of ammonia production in late 2011; and CH_4 emissions from rice cultivation, which is the major emission source in the agriculture sector, have decreased by 43.5 per cent in 2012 compared to 1990. The TTE noted that the transparency of the reporting could be further improved by including information on drivers for major fluctuations of GHG trends in future BURs.

33. The TTE noted an inconsistency in table 5.5 of the BUR, in which the sum of individual hydrofluorocarbon (HFC), perfluorocarbon (PFC) and sulphur hexafluoride (SF_6) emissions does not correspond to the total emissions reported in the same table. In response to technical clarification sought by the TTE, the Republic of Korea explained that the emission of disaggregated gases was presented by unit of mass, whereas the total emissions were presented as CO_2-eq. The TTE noted that the transparency of information reported would be further improved if the Party could present the values consistently or explain the use of the units in the future BURs.

34. Information on the estimation of CO_2 emissions from fuel combustion using the reference approach, which, although not mandatory for the Republic of Korea, was not provided in the BUR, and which, consequently, does not allow comparison of CO_2 emissions using the reference and sectoral approaches. In response to technical clarification sought by the TTE, the Republic of Korea provided information that CO_2 emissions from fuel combustion using the reference approach were estimated, although the TTE noted that they were not reported in the BUR. According to information provided by the Republic of Korea, in 2012 CO_2 emissions from fuel combustion using the reference approach were 4.85 per cent higher than those estimated using the sectoral approach. The TTE noted that using both approaches in the estimation of CO_2 emissions from fuel combustion could enhance the accuracy of the GHG inventory and to provide a useful tool for its verification.

35. The Republic of Korea has not provided information on key sources or key categories in the BUR. Therefore, the TTE could not conclude whether there has been a change in the list of key sources or key categories since the NC3. The TTE noted that providing the updated information and an explanation of key category analysis in the next BUR could further enhance the transparency of the national GHG inventory. The Republic of

36. Korea explained in response to the technical clarification sought by the TTE, that key category analysis was conducted and will be presented with explanations in the next NIR.

37. The Republic of Korea has not provided information on uncertainty analysis in the BUR. In the response to the technical clarification sought by the TTE, the Party noted that capacity building for uncertainty analysis is needed, especially in terms of practical application rather than learning theories, by the approach, for example, holding a brief seminar on application cases.

3. Mitigation actions and their effects, including associated methodologies and assumptions

38. As indicated in table 2 above, the Republic of Korea reported, in its BUR, information on mitigation actions and their effects.

39. The Republic of Korea included in its BUR information regarding the national and sectoral reduction targets and future emission pathways for a BAU scenario and a GHG emission projection scenario (mitigation scenario) that includes the effects of mitigation

actions until 2020. The TTE commends the Republic of Korea for providing information on its projections in the BUR.

40. The TTE noted that information on methodologies and assumptions for defining the BAU and mitigation scenarios was not provided in the BUR, although such information was provided in the NC3. It is not clear whether the same methodologies and assumptions as reported in the NC3 were used for the estimation of GHG emissions for the BAU and mitigation scenarios in the BUR. In response to technical clarification sought by the TTE, the Republic of Korea provided concise information on the methodologies and key parameters used for emission projections in the energy and non-energy sectors for the BAU and mitigation scenarios. In their review of the draft summary report, the Republic of Korea further clarified that national methodologies and assumptions for quantifying mitigation actions exist, although they were not presented in the BUR. The TTE noted that the transparency of reporting the mitigation actions would be further enhanced if such information is provided in the next BUR.

41. In its BUR, the Republic of Korea presented its road map to enable the country to reach its national GHG reduction target, which includes emission reduction policies and measures for each sector, with estimated total mitigation potentials of 119 Mt CO_2 eq and 233 Mt CO_2 eq by 2017 and 2020, respectively, assuming full implementation of the measures for each sector. These are 16.2 per cent and 30.0 per cent below the BAU scenario emission projections, respectively. The TTE noted that the transparency of the reporting such information could be further enhanced if detailed information on implemented policies that stem from the road map is further elaborated in the next BUR in textual and tabular formats.

42. The two major mitigation actions that support achievement of the national targets are the GHG and energy target management system (TMS) and the GHG emissions trading scheme (ETS). A detailed monitoring and reporting system implemented at the facility level is the key instrument for monitoring of implementation of these two mitigation actions. Institutional arrangements are established at national level, covering operation and the review of the system by the supervising agency and competent authority and third-party verification by accredited verification agencies.

43. The legal framework for TMS was adopted in 2010 and fully implemented in 2012, with the purpose of controlling GHG emissions from sources with high emissions and which are high energy consumers, through GHG emission reduction and energy conservation targets. Since 2014, any business entity that generates GHG emissions of more than 50 kt CO_2 eq and which has an energy consumption of more than 200 TJ annually, or that owns facilities that generate more than 15 kt CO_2 eq and have an energy consumption of more than 80 TJ annually, is a controlled entity under the TMS. In June 2014, 840 controlled entities were covered by the TMS and will be regulated under this system from 2015 onwards. The quantified results of the TMS of 21.3 Mt CO_2 eq reductions, accounting for 3.78 per cent of the 2012 total emission projections (563.6 Mt CO_2 eq), are presented in the BUR.

44. As a further step away from the TMS, the ETS is expected to significantly contribute to the achievement of GHG emission reduction targets, targeting sources with high emissions, which were covered under the TMS until 2014. A detailed allowances allocation plan has been established, with free allocation of allowances in phase 1 on the basis of historical emissions, but also including benchmarks (based on efficiency of facilities) for certain sectors (oil refineries, cement and aircraft). The legal framework for the ETS was adopted in 2012 and implementation of the ETS started in the Republic of Korea on 1 January 2015; for phase 1 of the implementation (2015–2017), 525 companies are expected to participate, giving a total of 68 per cent of the national total GHG emissions.

45. The Republic of Korea, in its BUR, has also provided in tabular format a description of sector-specific mitigation actions and their effects. All of these mitigation actions are in the implementation phase. These actions are distributed in the: energy transformation (2 mitigation actions); industry (9 mitigation actions); building (2 mitigation actions); transport (5 mitigation actions); agriculture, forestry and fishery (10 mitigation actions); and waste (6 mitigation actions) sectors.

46. For each mitigation action, the Republic of Korea reported information on the objectives of actions, classification, gases affected, starting dates and performance indicators. Information on the progress of implementation, quantitative results and goals, progress indicators, steps taken and envisaged, and timeline of implementation is only partially included and only at national level and for a few mitigation actions, not for each mitigation action. The TTE noted that the transparency of the information reported would be further enhanced if the Party included this information in its next BUR.

47. The Republic of Korea did not include information on its use of market-based mechanisms in its first BUR. In response to technical clarification sought by the TTE, the Republic of Korea indicated its involvement in clean development mechanism (CDM) projects. The Republic of Korea also indicated that issued certified emission reductions from CDM projects in third Parties could not been used for compliance under the ETS. The Republic of Korea may consider including more specific information on its CDM projects in its next BUR.

4. Constraints and gaps, and related financial, technical and capacity-building needs, including a description of support needed and received

48. The Republic of Korea, in its BUR, has extensively reported on the financial support provided as a donor country to other developing countries since 2010 through various multilateral, bilateral, regional and other financial mechanisms. The total sum of donations has increased by 80.8 per cent channelled through international organizations and by 39.0 per cent through bilateral aid in the period 2010–2013.

49. According to the information provided in the BUR, the Republic of Korea has not identified any constraints and gaps and related financial, technical and capacity-building needs, nor has it received any financial, technical and capacity-building support from other countries.

5. Domestic measurement, reporting and verification

50. The Republic of Korea has implemented a comprehensive national MRV system for the preparation of a national GHG inventory system, which has three main activities:

(a) Measurement and reporting, where the revised MRV Guidelines for the NIR and the CRF tables are provided by GIR to relevant ministries annually;

(b) Verification, which is conducted by GIR through analysing results derived from the preparation of the NIR and the CRF tables for each sector – if necessary, GIR may require an external review with a third-party external review;

(c) Deliberation and approval, where the verification report, together with the NIR and the CRF tables, is presented to the Management Committee for official approval.

51. The TTE also noted that a detailed MRV system has been implemented at the facility level for the purpose of monitoring implementation of the two key national mitigation actions: TMS and ETS (see para. 40 above). The TTE commends the Republic of Korea for the establishment of these two complementary MRV systems.

6. Any other information

52. The Republic of Korea, in its BUR, has provided information on its financial, technological and capacity-building support provided to developing countries such as Thailand, Viet Nam, Philippines, Cambodia and Indonesia, and organization of international professional training courses by GIR on the GHG inventory development process for a large number of developing countries (approximately 120 trainees from 30 countries in the period 2011–2013 have received training on development of GHG inventories).

D. Identification of capacity-building needs

53. In consultation with the Republic of Korea, the TTE identified the following capacity-building needs related to the facilitation of the preparation of subsequent BURs and participation in ICA:

(a) Supporting an increase in the transparency in reporting on institutional arrangements (including involvement of all stakeholders involved in the preparation of the BUR) for the preparation of the national communications and BURs on a continuous basis;

(b) Enhancing the transparency in reporting on updates of methodologies used to estimate GHG emissions, including information on updated activity data for the most recently available inventory years, any changes of emission factors, information on the rationale for recalculation, and information on the reporting of summary sectoral GHG emissions in the format of tables 1 and 2 contained in the annex to decision 17/CP.8;

(c) Improving the time-series consistency of the GHG inventory, improving the consistency of GHG data reported in the national communications and the BURs and practical application of uncertainty analysis according to the IPCC good practice guidance;

(d) Enhancing the capacity through benchmarking and sharing the best practices, to improve methodologies of quantification of effects of individual mitigation actions, and application of these methodologies consistently across the sectors, specifying time horizons, and using consistent and robust indicators and reporting accordingly;

(e) Defining the progress of implementation of the mitigation actions and the underlying steps taken or envisaged, and the results achieved of key actions;

(f) Developing projections using defined assumptions and linking projections with the GHG emission trends.

III. Conclusions

54. The TTE concludes that:

(a) Most of the elements of information listed in paragraph 3(a) of the ICA guidelines are included in the first BUR of the Republic of Korea. Some elements in areas of the GHG inventory and mitigation actions (see tables 1 and 2 above) have not been provided;

(b) The Republic of Korea submitted an update of its national GHG inventory covering all GHG gases (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6) for the years 1990–2012. The Republic of Korea has made significant progress in setting and maintaining institutional arrangements that enable preparation of the annual GHG inventory on a continuous basis and has developed a domestic MRV system tailored to the national circumstances (see paras. 25–27 above). The TTE believes that the completeness and

transparency of reporting could be further improved if information on updates of methodology, activity data and emission factors used for the preparation of the GHG emissions inventory is provided in the next BUR;

(c) The Republic of Korea has set a national target to reduce GHG emissions by 30 per cent below the BAU scenario by 2020. To achieve this target, the legal framework, institutional arrangements, mitigation actions and measures have been adopted and are in the process of implementation. The TMS and the ETS, that were introduced in 2010 and 2012 and fully implemented in 2012 and 2015 respectively, are the key measures that ensure the implementation of mitigation actions at national level across all sectors. The Republic of Korea has reported that implementing the TMS has resulted in 21.3 Mt CO_2 eq reductions in 2012. The Republic of Korea has also provided information for 34 implemented mitigation actions at sectoral level, describing the actions and detailing their objectives and performance indicators. The transparency of reporting could be further improved by including in the next BUR information at the level of each mitigation action on results envisaged and achieved, progress of implementation, quantitative goals, progress indicators, steps taken and envisaged, and time frames of mitigation actions;

(d) The Republic of Korea has not identified any constraints and gaps, and related financial, technical and capacity-building needs. Instead, as a donor country, the Republic of Korea reported on the financial, technological and capacity-building support provided to other developing countries in the period 2010–2013. Most of the support was provided through various multilateral, bilateral, regional and other financial mechanisms that targeted the Asia region, and has included both mitigation and adaptation components.

55. The TTE, in consultation with the Republic of Korea, identified six capacity-building needs related to the facilitation of reporting in accordance with annex III to decision 2/CP.17 and to the participation in ICA in accordance with annex IV to decision 2/CP.17, taking into account Article 4, paragraph 3, of the Convention. Key recommendations prioritized by the Republic of Korea are summarized in Chapter II(D) above.

Annex

Documents and information used during the technical analysis

Reference documents

"Composition, modalities and procedures of the team of technical experts for undertaking the technical analysis of biennial update reports from Parties not included in Annex I to the Convention". Annex to decision 20/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=12>.

"Modalities and guidelines for international consultation and analysis". Annex IV to decision 2/CP.17. Available at <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf>.

"UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention". Annex III to decision 2/CP.17. Available at <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf>.

"Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention". Annex to decision 17/CP.8. Available at <http://unfccc.int/resource/docs/cop8/07a02.pdf#page=2>.

First biennial update report of the Republic of Korea. Available at <http://unfccc.int/8722.php>.

Third national communication of the Republic of Korea. Available at <http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php>.